



Photo, by C. E. Roddison.

FIG. 1.—BRENTOR CHURCH, DEVONSHIRE.

DEVONSHIRE CHURCHES.

By HARBOTTLE REED, President of the Devon and Exeter Architectural Society.

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DEVONSHIRE cannot boast of numerous early churches, or even with certainty show one of pre-Conquest date; in this respect it can in no way vie with Northumberland. Of its British churches we have only the dedications, although some survived the Saxon incursion, and in Exeter the Celt and the Teuton lived peaceably side by side, the British quarter of the city having its churches of St. Kerrian, St. Petrock, and St. Pancras; but it would be difficult to pronounce any part of the present structures Celtic.

Of Saxon work scarcely a vestige exists, and while the more solid stone has vanished, it is left to a manuscript to represent that early period, one of the greatest treasures of Exeter Cathedral being a Saxon book, ascribed to Cynewulf, a bishop of Lindisfarne, about the eighth century. We have nothing to correlate with Jarrow, Monkwearmouth, St. Wilfrid's crypt at Hexham, Bywell, or Ovingham. We have no complete Norman churches, and even the thirteenth and fourteenth centuries are only evidenced in portions of structures; but there are scarcely any which are not either wholly or in part of the Perpendicular period, for a wave of church building left few untouched, and in the episcopate of Bishop Lacy (1420-55) it was perhaps at its highest flood; the Cathedral had been practically completed, and the parish priest was becoming a more powerful factor in the religious life of the people. It is more

especially with the work of this period that I propose dealing this evening, in what can only be a very cursory manner, seeing that there are some five hundred and forty parishes in the diocese, and of these there is only time to show a few illustrations of churches most characteristic of the local type, and that rather from a structural than an historical point of view.

Except the Cathedral and collegiate foundations of Ottery and Crediton, there are no churches of imposing dimensions ; those of the abbeys of Tavistock and Torre would indeed have been worthy compeers of Hexham and Tynemouth ; but Tavistock has almost vanished, and little is left of Torre.

It is not for imposing mass or grandeur that we must look ; few, if any, would not seem insignificant if compared with the edifices of East Anglia. Still, it would be difficult to find one without some individual interest, be it quaint irregularity of outline, touch of colour, carved oak, fragment of glass, or sculptured memorial of the men of Devon who in other generations loomed large in the making of English history.

Much of the added charm of scores of the Devonshire churches lies in their setting : some with warm red stone towers and walls nestling among light-green foliage, some with golden tinted stonework backed by dark pines, others with sturdy grey granite, as at Mary Tavy, standing up against rolling moorland or sheltered below some rugged tors ; St. Petrock's, at Dartmouth, placed upon the cliffs.

The site frequently stands for much in the history of the locality. For instance, Brentor Church [fig. 1], perched high on the summit (as its name implies) of an extinct volcano, a granite outpost of Dartmoor, is actually in the bounds of an ancient British stone-walled enclosure. With a legendary votive dedication by a storm-tossed seaman as the first land sighted from the Channel, the hill is at times so swept by the wind that it is impossible to face it and breathe ; yet there the low, almost fortress-like, church of St. Michael was planted—a most conspicuous object from the moor, and quite an appetising climb for the parishioners. To put a church in such a position to-day would ensure its emptiness.

A little further north-east we have Lydford Church, where it might be expected, close under the shadow of the Saxon castle (or, rather, where it once was, for the present four-square keep is Edwardian). Lydford was a town of very considerable importance when Athelstane was king, though now a mere hamlet ; the church included nearly the whole of Dartmoor in this parish, the extremities being about twenty-four miles apart. The granite squat tower and low triple roofs with small windows are of the breezy moorland type.

The local materials differentiate the churches. In some parts a dull brown carboniferous shale affords no readily squared quoins, and the nearest freestone being too remote to be employed for anything but tracery or mouldings, quoins and buttresses are avoided as much as possible.

In many localities the material is a grey limestone, with many-tinted lichen colours, while in others the red conglomerate shows warm against the trees, just as the old walls of Lindisfarne glow against the blue sky on a summer day. Unfortunately this breccia wears badly even when, as usual, the weatherings and tracery are of freestone ; it is, however, most picturesque, especially in decay, and associates very kindly with mossy fern and other accretions. This red conglomerate occurs in the centre of Devon. Grey granite is another building stone used on the borders of Dartmoor, and in the Perpendicular period it began to be adopted for tracery, naturally of a simple character on account of the labour involved.

Freestone was generally obtained from the quarries at Beer, which had been worked by the Romans ; white in colour and of fine texture, it is easily carved. Yellow oolite from Hamhill, and of the Bath-stone variety, was also used ; while in Edwardian days Caen stone was largely in request for wrought work in churches which afterwards adopted granite.

In East Devon flint was pressed into service, but not with much attempt at ornament; and in the locality of Exeter and Crediton a volcanic tufa was employed.

As the Cathedral would require considerable time for its description, I do not purpose to do more than glance at it as the mother church. Although in comparison with many of the English cathedrals it is small, its size prevented it from being used as a model for the country churches, and except at Ottery St. Mary we have no attempts to copy it on a reduced scale. From the Close its exterior is not imposing, but viewed from the outskirts of the city its long roof and sturdy Norman towers crown the eastern side of the hill on which Exeter is built with a suggestion of reposeful strength.

The Bishop's stool was removed from Crediton to Exeter in 1050, but of the Saxon church we have no remains; a large part, however, of its Norman successor, begun in 1112, still stands, notably the twin towers at the east end of the nave and the nave walls. The very unusual position of these towers gives to Exeter a grouping quite its own, not now as its founders intended when the coeval choir was of three bays only (somewhat resembling in position the church of St. Guinebert at Cologne), but the transeptal disposition of the towers preserved a balance without the huge intrusive piers required for a tower or spire at the crossing, and gave us one of the longest uninterrupted stretches of vaulting; and for beauty of groining it has few, if any, equals in this country. From the nave piers the vaulting shafts carry the eye up to the level of the sills of the clerestory windows, and from there the ribs spring evenly and naturally, sweeping upwards to the sculptured bosses at the apex; it is no great height to the ridge rib, but by reducing the triforium to a very low wall arcading the nave arches seem lofty, and this is accentuated by the form of the piers, which show five attached columns on each face and no heavily carved capitals to interrupt the upward tendency. The great west window occupies the whole of the west wall from the level of the pier capitals.

Passing under the organ screen in the choir, facing east, the magnificent oak throne, some fifty-two feet high, immediately arrests the attention: it dates back to the first quarter of the fourteenth century, and is a beautiful piece of work. In the east window early Perpendicular tracery fills the place of the "Decorated" stonework, and still holds the rich coloured glass, the best preserved in the Cathedral.

By far the most delicate piece of stonework is the sedilia in the choir. Despite the loss of the figures it is very beautiful: so light and graceful—it seems too slight for masonry. Tewkesbury Abbey has some slender work very much resembling this. Here the seats are graduated in the usual English fashion, and at the back of each stall is carved a head, eloquent of the day when, led by Edward the Confessor and his queen, Leofric was installed as first Bishop of Exeter.

From the sanctuary steps the whole length of the choir and nave is visible, with the west door in the distance. The screen still stands, despite the wordy battle for its removal to the west end; the compromise in the shape of piercing the arcading is a distinct gain. As we view it, the Cathedral spells "Decorated"—the carved corbels, vaulting, wonderful throne—but hidden in the stalls are the misereres of the militant crusading Bishop Brewer (1224-1244), full of interest.

The west front seems to have reacted upon the smaller churches: it is squat, and yet not without charms of its own. Its Norman west wall still stands cut into for a large west window and buttressed up by the Perpendicular screen. Grandison's Chantry is in the thickness of this screen. Here the recurring problem presents itself—a crumbling stone gradually losing all form of moulding or tracery: must it be allowed to become ultimately shapeless, or shall it be renewed ere its lines are past reproduction?

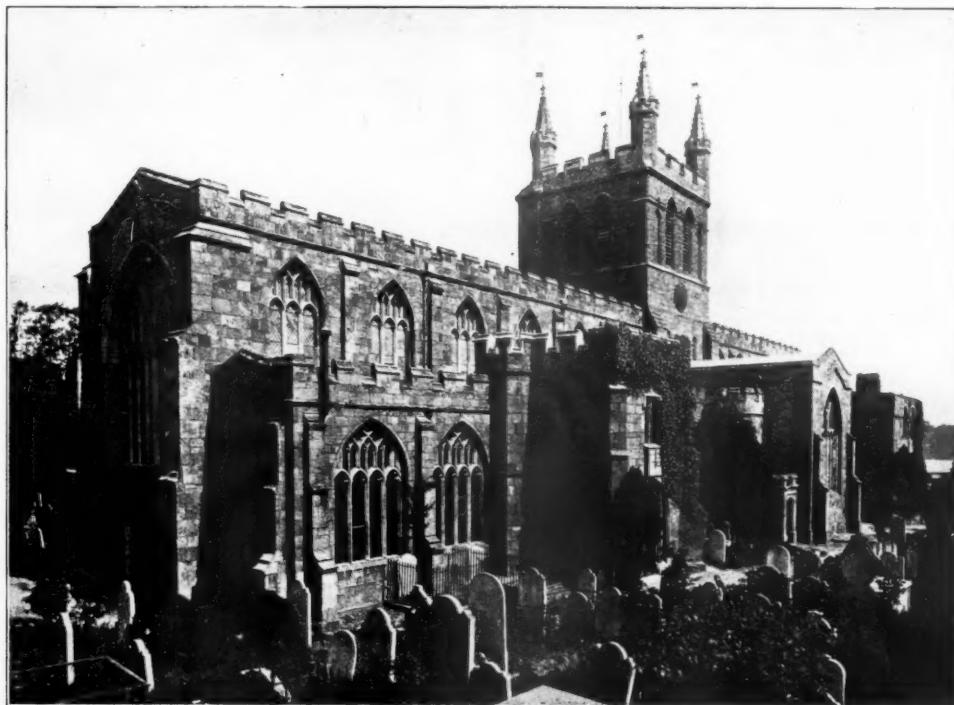


Photo, by Valentine.

FIG. 2.—CREDITON CHURCH : NAVE.

Foremost among the parish churches stand Crediton, Ottery St. Mary, both collegiate; Cullompton, Tiverton, St. Andrew's (Plymouth), Tavistock, Kenton, Paignton, Ashburton.

It was at CREDITON [figs. 2 and 3] that the Bishop's stool was fixed until its removal to Exeter in 1050, and the church seems to have retained in a large measure its dignity, being served by eighteen canons. In 1547 it was vested in twelve governors. A strip of the richest red land in Devon runs through this valley, and the church is worthy of its surroundings. Cruciform in plan, it has nave and choir with aisles, north and south transepts, with tower at the crossing, eastern Lady chapel, south porch and vestries, over the latter being a room known as the Plumbery, where the lead for roof repairs was recast. The nave and choir,



Photo, by Valentine.

FIG. 3.—CREDITON CHURCH.

175 feet long by 50 feet wide, are of the Perpendicular style, of good proportion, with clerestory over; but the heavy lower Norman stage of the tower being allowed to remain, the choristers are obliged to be placed under it, and not in the choir, in order to be effective.

Built with local felspathic trap, one writer says:—“The rich warm colour of the stone is one of the happiest accidents of the church. As in the Cathedral of St. Davids, where the purples and deep greys of the native Cambrian rocks have been largely brought into play, the natural colouring of these Devonshire traps gives a dignity to even indifferent architecture, and renders polychromatic decoration not only unnecessary but almost an impertinence.”

Portions of the work are Norman, Early English, Decorated, and Modern, and it will be seen that the remaining Perpendicular work is the greater part. The nave arcade is very

massive for this period, and has a dignified effect. In the choir the wall shafts spring from the pier capitals and add to the apparent height. Of the sedilia sufficient is left to prove it was of great beauty.

A somewhat monotonous effect is produced by the repetition of the same window tracery ; even the east and west windows are now, though not originally, identical, and being of eight lights awkward for glass. Recently re-roofed with low-pitched lead roofs the oak ceiling work is a good example of local workmanship.

The porch with parvise over is now a library. Of the Saxon palace on the north side nothing remains but the name.

OTTERY ST. MARY* is a somewhat unusual instance of a direct imitation of a cathedral on a small scale ; and, further, it is an example of a building by men of a later date in the spirit of a past age ; although dedicated by Bishop Brionescombe in 1269, a great portion of the church was reconstructed by Bishop Grandison, who, having completed the appointments of the Cathedral, took in hand Ottery St. Mary about 1337, and raised it to the dignity of a collegiate church.

A reference to the plan will show the similarity :—north and south transeptal towers, which apparently, unlike Exeter, always were open as transepts ; transepts to choir, eastern Lady chapel ; the north tower still has a lead-covered timber spire, such as the north tower of Exeter one time showed. Bishop Brionescombe's work included the choir, and Grandison rebuilt the choir, Lady chapel, and nave, and revaulted the whole church.

A comparison of dimensions shows the width of the Cathedral nave to be 40 feet, Ottery 20 feet ; Cathedral aisle 17 feet, Ottery 8 feet 6 inches ; Cathedral choir 150 feet long, Ottery 75 feet long ; Cathedral Lady chapel 58 feet long, Ottery 28 feet long ; Cathedral Lady chapel 26 feet wide, Ottery 18 feet wide.

The length of Ottery nave is much less than half that of the Cathedral, and this half-scale makes the nave, bays, and aisles too narrow, and the church generally loses in effect. In consequence it does not produce a good impression, but, despite this drawback, it is a building replete with interest.

Stretching across the Lady chapel is a minstrels' gallery, of Decorated date, occupying a somewhat uncommon position. The restored stone reredos, of canopy work of the same period, stretches up to the clerestory, and there is a triple sedilia of the same time ; the seats are not graduated as at Exeter. There is no east window to the choir. Over the north and south chapels are chambers, that on the north being known as the Chequer, or college treasury.

There are no fewer than nine varieties of vaulting, the most elaborate being that in the Dorset aisle—a fine specimen of fan tracery with five pendentives. This aisle was erected in the first or second decade of the sixteenth century. Over the north porch were two chambers for watching priests, with windows commanding the interior as well as the approaches to the church. The lancet windows with Decorated mouldings are not elsewhere often met with, or such a number of consecration crosses as show on the exterior.

Among many points of interest are the tower gargoyles, of vigorous expression, those on the north being more diabolical ; the west window head, with the lancets flattened on one side ; the door to the collegiate buildings now gone ; the Dorset or north aisle seems out of proportion to the building. In the interior a niche occurs over each arch of the arcade, but the statues are missing.

CULLOMPTON CHURCH [fig. 4], built early in the fifteenth century, is somewhat ornate. In a very prosperous country town, situated in a fertile valley, it was not wholly erected at one

* For Ottery St. Mary see Paper by Mr. Francis Bond on "The Chronology of English Cathedrals," JOURNAL R.I.B.A., 26 Nov. 1898, p. 27.

time. The Lane Chapel, with its beautiful fan vaulting and external sculpture, was founded by John Lane, a wealthy wool merchant, as indicated by the shears and very fine carvings of ships. A wide label gives his name and date 1526.

The tower is a very fine specimen, in many points resembling the Somerset type. Built of rich red stone with yellow freestone dressings, it is 100 feet high to top of battlements and 113 feet to top of pinnacles. The Renaissance spirit is evident in the carvings on the face of the tower, especially in the canopied Crucifixion group. Massive buttresses, continued almost to the battlements, have an effect of strength; and although the walling is vertical, the set-back above each string gives a battering appearance on the whole height. Pierced panelling fills the bell-chamber windows.

Of five bays the Lane aisle or chapel gave great scope for glass, that at the west end being of six lights, and correspondingly larger. A bay of this chapel shows the windows 9 feet wide by 15 feet high, the moulding being a bead and hollow. Details of the carvings include spirited ships with fighting tops, initials and merchants' marks, trade emblems, &c.

The clerestory appears to be an addition to the original, and it is spanned by a panelled wood ceiling, the compartments being elaborately subdivided, each rib being edged with cresting and the intersections covered with carved bosses; a carved and crested cornice is broken by angel corbels at the foot of each rib. The internal walls of this church were covered with frescoes.

ST. PETER'S, TIVERTON [fig. 5], is of the three-aisle type, to which a south chapel and porch were added in 1517 by John Greenway, a merchant and member of the Drapers' Company. The vaulting of this chapel is very fine, and the exterior most profusely decorated with carvings of New Testament subjects, merchants' marks trade emblems, arms, and grotesques, the carvings of ships being remarkably good. The churchyard adjoins Tiverton Castle, once the residence of the Courtenays, who have left their mark on the church, the position of which on the river bank reminds one of Durham.

KENTON [figs. 6 and 7], built shortly before 1379, is 118 feet long by 42 feet broad:

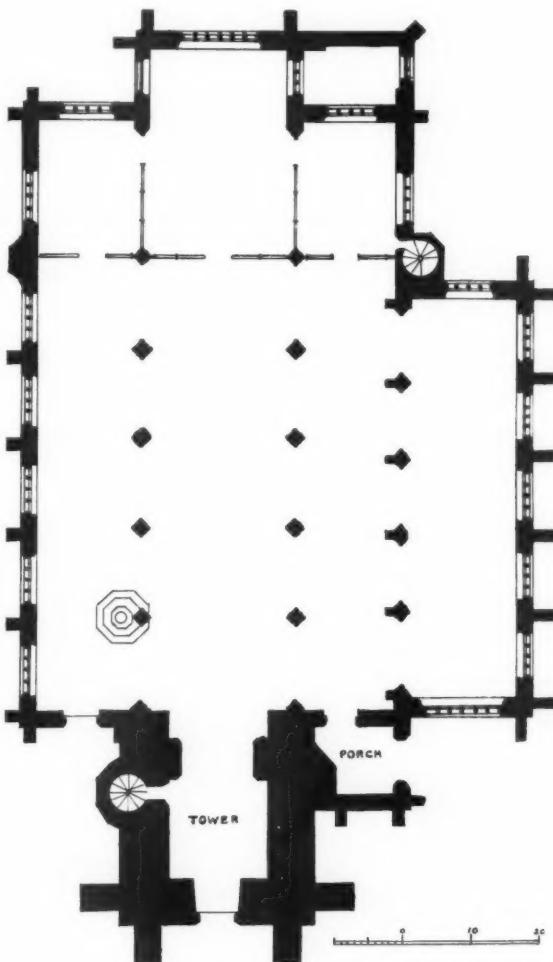


FIG. 4.—CULLOMPTON CHURCH: PLAN.

triple aisles, continuous roof to nave and choir, battlemented aisles ; stairs to rood-loft, fine screen, buttress weathering, and gargoyles. It has a south porch with parvise over, niche over door, very large windows (some fragments of the old glass remain) ; east window large and sill low. It has been termed by an old writer a "luminous" church, and certainly the area of fenestration is very large. The caps of columns here become merely a band of foliage which projects beyond the mouldings relieved by masks.

PAIGNTON has a stone screen with elaborate canopies to Kirkham Chantry, on the south side. This is another of the red stone churches ; the tower buttresses are not continued up



Photo. by Mudford.

FIG. 5.—TIVERTON CHURCH.

the last stage. It has a churchyard cross, of which there are numerous examples, but all of very plain design.

At ASHBURTON are transepts to the aisles, and at the east end is an ancient vestry approached through doors on either side of the altar. There are very few old vestries in the diocese. The proximity to the moor is shown by the rather crude window tracery, and the tower is of very simple form.

EXETER contains a disproportionate number of churches compared with its population, but many of them are small. St. Martin's is disused, and the problem presents itself, what can be done with it ? Only last year Allhallows Church in Goldsmith Street was demolished ; the tradesmen who at one time resided in the parishes now live in the suburbs, and these little

churches are well-nigh forsaken. The west window is a gift of Bishop Lacy, and his arms appear in the glass. It is of better proportions than often seen. There are several ponderous Georgian monuments and sacrarium fittings of that time. Together with the adjoining Elizabethan house it groups picturesquely, but its removal has been suggested.

St. Mary Steps is another old city church, more quaint than beautiful.

St. Mary Arches shows by name that it held an unusual place in the Exeter city churches, which in Norman times probably were without aisles; after the nave arcade the principal interest is in the monuments to eminent citizens, and it has a regalia stand and a very fine piece of embroidery converted into an altar-cloth. Another Exeter church, St. Petrock's, has a pall made up of portions of an embroidered cope or chasuble; at Tedburn St. Mary a few years ago was a rather fine old cope.

St. Olave's is another Exeter church dedicated to St. Olaf shortly before the Norman Conquest: it shows the usual type of local window, and is of interest chiefly from its connexion with Gytha, the mother of King Harold

INTERIORS.

There is a great similarity in the nave arcades, the piers in plan generally being set diagonally, having a half-column at each angle with flat ogees between. In some few cases the impost is broken and the ogee continues around the arch [see fig. 8], but as a rule the capital is moulded and carved, especially with foliage and figures, as at Cullompton.

Where granite is used, a shallow hollow generally replaces the ogee. It is not unusual to find the columns monolithic, especially where granite, and even in the red conglomerate. Some of the pier stones are 7 feet deep at Kenn [fig. 9], the caps and bases being splayed only.

At Berry Pomeroy, where the church appears to have been rebuilt in the fifteenth century by one of the Pomeroy's, the south aisle was added—probably in the early sixteenth century—by several subscribers whose names are carved on the arcade caps, in each case being that of husband and wife; as also at Honiton.

The nave piers at Totnes are more elaborate, while those at Stoke-in-Teignhead have canopied niches in the foliage bands. A clerestory is of rare occurrence.

Lydford interior has monolithic piers and four centred arches. The usual Devonshire floor gradation was one step up or level at the screen and another to the sanctuary, and with a low east window the altar cannot have been raised very high.

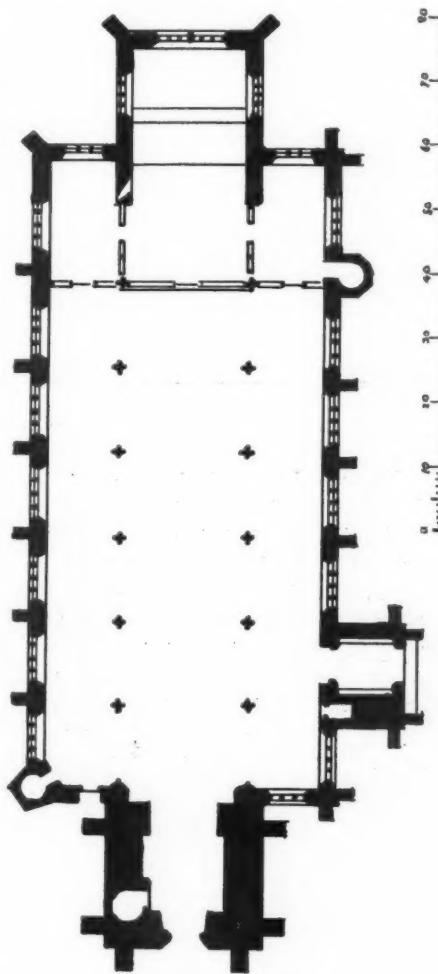




FIG. 7.—KENTON CHURCH.

The typical ground-plan comprises a chancel and nave with tower at its western end, north and south aisles continued north and south of the chancel, but slightly shorter than the choir, the three roofs being separated by gutters over the arcades; a rood screen running across nave and aisles—at Uffculme 67 feet long—the continued aisles forming chapels cut off from the choir by parclose screens, and provided with altars and piscinae and doorway, a south porch with stoup on the right hand of the inner door, a parvise over porch. A north door opposite the south porch is not always found, while the position of the church in many cases demands the north porch as main entrance, as Axmouth, where the Norman door with its tympanum remains. This represents larger churches. Some are without aisles; others, as East Ogwell, nave and north aisle, with transeptal chapel on the south side; Abbots Kerswell, with one north aisle and south porch. Tavistock, a very large church, has a double south aisle; and Plympton St. Mary has nave and four aisles. There is, of course, much variety in the earlier plans, as at Ilsington and Townstall, and Tawstock, with Decorated transepts. One of the most capacious churches is that of St. Andrew's, Plymouth, of the three-aisle type.

SPIRES.

Spires we naturally expect to find on flat ground or in valleys. Devon is anything but flat, and the old builders seemed to prefer setting the church where its light might be seen—if not on a hill, at least on a hill-side; consequently of spires there are but few, and these of no special interest. Bishop's Tawton (where the bishops of Exeter had a residence) has one of Decorated date, crocketed and banded. Of simpler form one may be seen at Ringmore over the south porch, and others of little pretence at Slapton, Bigbury, Buckfastleigh, and Diptford. Barnstaple has a timber spire, lead-covered in 1636, and not quite so much awry as Chesterfield. The ground plan shows a good deal of expansion of the old church. In the

same locality is Braunton, with single span, Early English nave, and tower finished with a lead-covered spire—a great contrast to the later churches in fenestration. Picturesque shingle spires may be seen at Ashford and West Worlington and Brushford.

TOWERS.

If lacking in spires, towers are much in evidence, the majority being of Perpendicular date. South Brent has an Early Norman tower. Sidbury has one of the twelfth century, but capped by Perpendicular spire and battlements. Chudleigh has an Early English western tower, as has Clovelly. The latter was Kingsley's father's church, and in it are some fine brasses. The tower could hardly be simpler in form. Branscombe Church, near the Beerstone Quarries, is of Norman and later styles, the tower being at the east end of the nave—a not very usual position in Devon, although it occurs at Shute, Axminster, and Kingsbridge—the usual place being at the west end of the nave, as at Dodbrooke, where the size of windows may be noted in the south aisle, and also the porch, with parvise over in west bay of aisle. The three windows are of granite, with a minimum of labour expended on them. Angle buttresses and absence of strings may be noted, as well as the prevailing form of four-centred doorway under horizontal label.

Harberton is much more ornamental, the tower being in three stages with quoins and two buttresses to each angle of tower, the staircase being on south side, very large windows without labels and battlemented roofs, with the porch and parvise in the usual place. Kingsbridge, having a cruciform plan, has a tower and spire at the crossing.

Sheepstor has a plain square granite tower with little attempt at buttresses and rather top-heavy pinnacles: this is a strong contrast to a tower like that at Chittlehampton, one of the finest in Devon: it is 103 feet high to the battlements, and known as "Beauty." Chulmleigh and Broadelyst have also fine towers.



FIG. 8.—SWIMBRIDGE CHURCH.



Photo. by Rev. H. Fell.

FIG. 9.—KENN CHURCH.

Colyton has a square tower at the crossing, battlemented and pinnacled, from which rises an octagonal lantern. Flint walling is used. Another singular feature of this church is the large west window which fills the west end of the nave and reaches almost to the floor.

Axmouth is a fair example of the common tower.

WOODWORK.

The chief glory of the Devon churches is in their woodwork ; unlike the freestone, oak was plentiful and craftsmen were forthcoming who were equal to the task of producing beautiful forms in tracery and endless varieties of carving.

“ Trust me, no mere skill of subtle tracery,
No mere practice of a dexterous hand,
Will suffice, without a hidden spirit,
That we may or may not understand,
And those quaint old fragments that are left us
Have their power in this—the carver brought
Earnest care and reverent patience, only
Worthily to clothe some noble thought.”

The Bishop's throne in the Cathedral, made about 1317, is a magnificent piece of constructive carpentry lavishly carved. Little oak work of this date is left, but in the Perpendicular period, from about 1450 to the Reformation, highly ornate screens were introduced into almost every church. Both material and workmanship seem to have been local, although there are indications of outside influence: the great similarity points to a school of carving in Devon, Cornwall, and Somerset.

Staverton screen has been restored and a new rood-loft constructed; the restoration is based on that at Atherington, where four and a half bays of the screen with gallery over still remain across the north aisle, having a total height of 15 feet 10 inches. The floor of the gallery being 11 feet above aisle is 4 feet 3 inches wide. The vaulting coves spring from angel corbels, and the compartment panels are carved with figures and have bosses at the intersection of the ribs. The west front of the gallery is panelled, surmounted by richly wrought canopies finished by a vignette cornice mould with interlacing cresting. The panels were painted with scriptural scenes as in Exeter Cathedral. The vignette enrichment of the cornices is in three divisions [fig. 10], with cresting above and below. An undulating vine branch with vine leaves, grapes, and tendrils form the foliage strips, and they are modelled with much spirit but conventional repetition; plain beads intervene. At Lapford they take the form of cable moulds, and the foliage is more varied: this screen has much in common with Atherington, and is of a Renaissance type, the groin panel being quite Italian in treatment.

There are several types of screens, varying with the localities, some showing Flemish and others Spanish or French influence.

Kenton has been ably restored and provided with a rood gallery. It is now one of the finest screens in the county. At Lew Trenchard another old screen has been restored, and the rood-loft gallery provided with painted panels.

These enable one to judge the important place the rood-loft held in the old churches. Of the rood itself we have no example remaining. At Cullompton the golgotha or base with mortises for cross is preserved, though not *in situ*. The base of the Kingsbridge rood is also preserved. It is not to the Tudor Henry VIII., Edward VI., or Elizabeth, who ordered the removal of the rood-lofts, that the entire destruction of the screens themselves must be ascribed; many persons now living remember the removal of screens of great beauty, some of which found a resting-place in other churches, as in St. Mary Steps; that from South Huish is placed in the private chapel at Bowring'sleigh House. Evidently there was no active opposition such as met Edward VI.'s commissioners when they proceeded with the demolition of the rood-loft at St. Nicholas', Exeter. On that occasion the church defenders were women—we have a graphic account by a contemporary—and they asserted themselves in a very



FIG. 10.—LAPFORD CHURCH: DETAIL OF SCREEN.

militant manner, throwing missiles at the workmen. Whether they did most damage to the screen or to the workmen I do not know; but it is mentioned that the latter hardly escaped with their lives, and suffered broken ribs.

In addition to these, there are numbers of screens still retaining their groining and cornices. At Harberton we have the usual treatment, and with lower traceried and painted panels; at Littleham and a few others the panels are completely traceried, but generally they are filled with figures of saints, as at Ashton, Bradninch, and Plymptree, and are the major part of our medieval paintings, being a most interesting series, which would occupy too much time to enter upon on this occasion.

At Harberton the casing of the piers is partly original and partly made up with portions of the gallery. The stone pulpit is quite in harmony with the screen, even if the modern figures seem painfully conscious of their position. The parclose screens, as a rule, were flat with light cornices.

DARTMOUTH.—A local peculiarity of the Dartmouth type of screen is shown in the crocketed tracery of the bays. The painted figures are gone from the lower panels, and a modern cross has been fixed over the centre bay. Some very fine foliage ornaments the stone pulpit. Altogether the church is very interesting.

Of stone screens few remain, the finest being at Totnes, extending across the church, dating about 1460. Denuded of a gallery, it still has a very light and graceful appearance. Access to it was direct from the choir by a fine panelled projecting stone staircase, partly remaining: this is a rare position, the turret generally being in the outer wall of the north or south aisle. The east window is low, and the nave has a barrel ceiling with flat roof to aisles; the nave piers have a faint resemblance to those of the Cathedral. There are no steps to the choir. When the church was rebuilt in 1492, another method of raising money than bazaars was adopted by Bishop Lacy, who granted a forty days' indulgence to all who contributed to the work.

Stone screens still remain in part at Awliscombe, Colyton, Paignton, &c., but oak was the favourite material, as at Swimbridge [fig. 8], Bridford, Kenn, Pinhoe, Bovey Tracey, Cul-lompton, Uffculme, Bampton, Atherington, Marwood, Colebrook, Coleridge, &c., the earliest being at Welcombe.

The screen in Exeter Cathedral was known as "the pulpytte," and from it there and in some other churches the Gospel was read and sermons preached. In village churches it sometimes held the musicians and probably at times a small organ. When there was no chancel arch the space between the loft and roof was filled in with boarding to form a background for the rood: this was termed a "tympanum." In many cases the screens were not constructed with rood-galleries, but finished with a slight coving or cornice, as at Stokeinteignhead, Willand, &c. That at Cruwys Merchant is Georgian in Corinthian style.

Passing from the screens, which in themselves are of engrossing interest, we turn to the roofs, the internal woodwork of which in no way approaches that of East Anglian or Northamptonshire churches.

A favourite form of ceiling is the waggon-head or barrel shape, and to turn a slide upside down, such as that of Clovelly, Swimbridge [fig. 8], or Braunton, the idea of the nave or ship would be very complete: there are the oak ribs, and you might be standing in the bilges of a wooden vessel, each rafter with complete curved braces plain as in the choir, or with longitudinal ribs moulded and carved as in the south aisle. Another variety provides moulded ribs at intervals; and where special treatment is called for, as over the rood-loft, the compartments are boarded and have diagonal ribs, all enriched by cresting and the panels relieved with carved ornaments, and all intersections covered with carved bosses, as at Lapford [fig. 11] and

Chittlehampton. The wall plate, carved and moulded, is frequently broken by angel figures at the feet of the main ribs.

The earlier roofs of small churches were probably thatched, though there are none now so covered. In Norfolk they still exist, and it is only a few years ago that I replaced one with tiles. When the thatch gave way to rough slates, people probably detected draughts from the open roofs, and the curved timbers were boarded, and later plastered, leaving only the moulded ribs and bosses exposed. Roofs of such construction as might be expected, frequently spread, and symbolism was suggested to fit.

At Nymet Rowland the nave arcade piers and arches are of oak ; also at Loxhore.

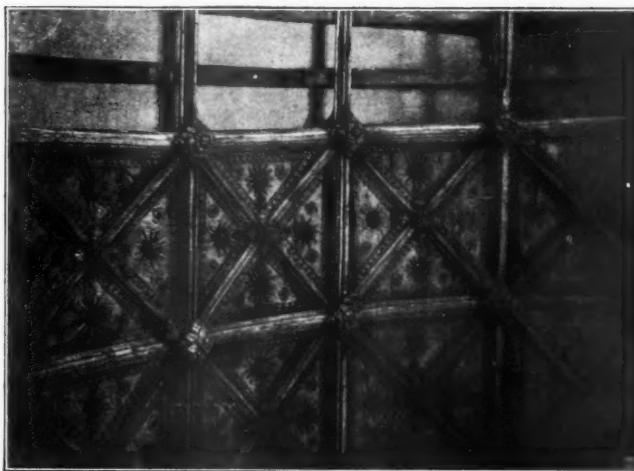


Photo. by the Author.

FIG. 11.—LAPPORD CHURCH : CARVED CEILING OVER ROOD-LOFT.

There are many fine pulpits, but none that I recall of earlier date than Perpendicular.

Those in stone correspond generally in design and detail with the screens, suggesting that they were carved by the same men who made the screens, and consequently more accustomed to manipulating wood than stone. That at Dartmouth rises from a small panelled stem, traceried carving spreads outwards and upwards to an octagonal pulpit with small crocketed canopies on each face, the angles, base, and cornice being carved with luxuriant large-leaved foliage and finished with a cresting ; badges are in the places no doubt originally intended to be occupied by statuettes.

At Harberton is another fine example of a similar character where the statuettes have been renewed in modern times.

Totnes, Chittlehampton, South Molton, and Pilton are after the same type, but not so richly carved. At Bovey Tracey, which has two tiers of canopies, the stem has been removed and the pulpit lowered ; the top-heavy appearance certainly is not altogether satisfactory. Paignton has also a stone pulpit.

Wooden pulpits abound of Perpendicular, Elizabethan, and Jacobean work : the form resembles the stone, one of the finest being at Kenton, where the foliage, like that on the screen, is most exquisitely carved, the artistic bent of the craftsman leading him to revel in most unlooked-for treatment of his leaves and tendrils and the introduction of natural objects. There is a wonderful pliability in the disposition, and the extent of undercutting and interweaving is surprising. It has recently been reconstructed from fragments which, with better fortune than usual, had been preserved.

At Ipplepen is a fine carved oak pulpit in this series. Holne and Ideford show how old bench-ends and portions of screens have been jumbled up to form pulpits.

PULPITS.

Cockington has a good pulpit of pronounced Renaissance type, while those of the Elizabethan and Jacobean are often met with, as at Ogwell, Allhallows Goldsmith Street, Exeter (demolished last year), Axminster (1633), and Great Torrington. There are pulpits at North Molton, Hartland, and Coleridge.

Sounding-boards have not all been removed. There is one at Pilton, but the so-called Gothic restorers swept away most of them as being post-Reformation, and therefore to be abolished. In Pilton there is a curious projecting iron arm for the hour-glass.

LECTERNS.

In St. Thomas's Church, Exeter, is a splendid oak lectern of Decorated style: a triangular base, panelled and canopied, forms the socket for a sliding book-rest, consisting of an eagle upon a sphere. The height can thus be adjusted to suit the reader. It is said to have been obtained from the Cathedral.

SEATS.

At Bickleigh is one of the red stone small village churches, externally of little attraction, but internally the reverse in respect of its monuments and carved oak bench-ends. At other churches, as Atherington, Cullompton, St. John's-in-the-Wilderness, Lapford [fig. 12], Clovelly, &c., are very massive benches, sometimes $3\frac{1}{2}$ inches thick, adze-hewn, with ends in cases as much as $4\frac{1}{4}$ inches thick, elaborately carved out of the solid, with small tracery



Photo, by Rev. H. F. C.

FIG. 12.—LAPFORD CHURCH: BENCH-ENDS.

panels, as at Braunton. Ilsington has a few good decorated bench-ends. At East Budleigh they are very crudely carved (1537). At Combe-in-Teignhead grotesque figures are introduced on the ends. Abbotsham, Ashton, Lapford, Chittlehampton, and Chudleigh show examples. Holecombe Rogus possesses a fine manorial pew, and at Cruwys Morehard the seats (of the seventeenth century) are lettered with the names of the various farms, &c.

FONTS.

I do not propose to do more than mention a few fonts; many are almost duplicate, and few of extraordinary interest. At St. Mary Church, Topsham, Stoke Canon, and Alphington there are very early Norman fonts on which symbolical figures—of varied interpretations—are sculptured. Numerous fonts of first transition date are preserved, as Farringdon, Coffinswell—Early English fonts varying in pattern from a mere bucket form, as at St. Pancras and Lydford, to more elaborate large square panelled bowls on columns. Two portions of the buildings were often spared by the fifteenth-century remodellers, the south door and the font, possibly out of a feeling that by one the place of the church was entered, and at the other admission to the church itself was gained. Sometimes the question arises, Was the font brought from some other church where it had been superseded? Although the fifteenth-century builders spared the font, such consideration in many cases has not been repeated in the nineteenth century, when the destroying restorers have re-dressed and re-carved out of all recognition the old work, and the only thing one can be certain about is the antiquity of the material.

Perpendicular fonts are, of course, very frequently met with, mostly octagonal in plan, as at Whitechurch, with traceried panels in stem and bowl enriched with coats-of-arms or foliage. The old position was immediately on the left on entering the south door, although many have been removed to the tower. With few exceptions the locking covers required by ordinance to be provided to the fonts are gone; instead of them at Pilton, Swimbridge [fig. 8], and Shaugh we have cupboards panelled and carved. At Pilton it is against the north wall of the nave.

COLOUR.

Little is left in the way of mural colour decoration, but at Dodbrook are mural paintings of St. Thomas-à-Becket. Cullompton, Littleham (near Bideford), and Axmouth have fresco work, the latter of very early date; while many rood-screens are adorned with figured panels, especially Ashton, Bradninch, and Plymtree. Some fragments of old glass remain, but except in the Cathedral there is little left, and even there hundreds of feet of beautiful stained glass have in years gone by been cut up into strips and kaleidoscopic patterns. At Doddiscombsleigh a window of the seven sacraments still exists; at Ashton, Dunsford, Littlehempston, Abbots Bickington, Bampton, Bere Ferris, and Coleridge is some old glass.

MONUMENTS.

We have not only the buildings, but the petrified counterfeits of the men who actually worshipped in them: proud lords, highborn ladies, belted knights, and ermined judges have stately monuments, affording an excellent field of costume study: the Seymour monument at Berry Pomeroy, the Acland monument in Broadclyst, Reynell Taylor's at Wolborough, Leach at Calverleigh, the Carews at Haccombe, &c. In the later work alabaster is largely used. But not only the sculptured urn and animated bust afford opportunity of rehabilitating those of high degree in bygone days, but a large number of brasses proclaim their virtues as faithfully as post-mortem descriptions generally do. The best brasses are at St. Saviour's,

Dartmouth, to John Hawly and wives (1408) under a triple canopy, and at Stoke Fleming, to John Corf and granddaughter, standing on a low pedestal (1391) with canopy; those of the fourteenth century remain at Stoke Fleming and Stoke-in-Teignhead. There are seven of the fifteenth century, and the sixteenth century is represented in seventeen churches, and the seventeenth century in fourteen.

LIST OF CHURCHES.

The following is a list of interesting churches, and, unless otherwise mentioned, the present buildings date from the fifteenth or early sixteenth century. The most convenient railway station is indicated by †, and the distance given in miles, while the district is shown by the large capitals, as EXETER:—

EXETER. Cathedral.
 St. Mary Arches: Nor. nave, monuments, embroidery, ironwork.
 St. Mary Steps: Font (Nor.), screen, clock.
 St. Pancras: Query of British foundation; early plan; Nor. and E. Eng. remains; also fragments of Roman tiles, pottery, &c.
 St. Petrock's: Curiously situated; the plan, with successive developments, is singular. Monuments, plate (sixteenth and seventeenth centuries), embroidery.
 St. Lawrence: Screen.
 St. Stephen: Chancel and arch over public thoroughfare; rebuilt seventeenth century.
 St. Thomas: Oak lectern.
 Littleham † (Exeter, 12 m.): Screens.
 Poltimore (Pinhoe †, 2 m.): Screen, font.
 Broadclyst †: Tower, windows, and monuments.
 Kenn (Exminster †, 2½ m.): Screen.
 Shillingford (Exeter †, 3 m.): Brasses.
 Kenton (Starcross †, 1½ m.): Tower, porch, screen, pulpit.
 East Budleigh †: Screen, bench-ends.

OTTERY ST. MARY †. Collegiate church: Two transeptal towers and eastern Lady chapel, minstrels' gallery, fan vaulting.
 Honiton †: Screen, pier-caps.
 Awliscombe (Honiton †, 2 m.): Stone screen.
 Payhembury (Sidmouth June †, 2½ m.): Screen.
 Sidbury (Sidmouth †, 3 m.): Nor., E. Eng., and later.
 Salecombe Regis (Sidmouth †, 2 m.): Nor., E. Eng., and later; interesting from its early work and a building at the north-west angle of problematical use.
 Axminster †: Central tower (Nor., E. Eng., and later), parvise, sedilia, oak pulpit (1633).
 Colyton † (Axminster): Central tower with octagonal lantern.
 Coombepynne †: E. Eng. and later; tables, pre-Reformation chalice.
 Branscombe (Seaton †, 4 m.): Nor., E. Eng., and later.
 Axmouth (Seaton †, 1 m.): Nor., E. Eng., and later; early frescoes, inscriptions, effigy.

TIVERTON †: Nor. door, Tudor work in Greenway aisle with vaulting, monuments, brasses.
 Bickleigh † (Tiverton, 4 m.): Bench-ends, monuments sixteenth and seventeenth centuries.
 Cadeleigh † (Tiverton, 5½ m.): Monuments, floor tiles.
 Bampton †: Screen and roof, glass, altar tombs.
 Halberton (Tiverton June †, 2 m.): Screen and pulpit.

Sampford Peverell (Tiverton June †, 3 m.): E. Eng. and Perp.; Nor. font, screens, monuments, brass.
 Loxbere (Tiverton †, 4 m.): Woodwork.
 Holcombe Rogus (Burlescombe †, 2½ m.): Carved oak-work, screens, roofs, manorial pew, monuments.
 Crwys Morehard (Tiverton †, 6 m.): Seating and screen, 1689.

CULLOMPTON †: A fine Perp. church, elaborately panelled and carved on the exterior, especially the S. aisle, with marine and mercantile subjects and floriated inscriptions. A clerestory and noteworthy tower profusely sculptured externally, a screen, carved roof, frescoes, fan vaulting, body stones, leadwork.
 Kentisbeare (Cullompton †, 3 m.): Screens, brass.
 Bradninch † (Hele, 1 m.): Screen with painted panels.
 Plymtree (Cullompton †, 4 m.): Screen with painted panels.

CREDITON † (Exeter, 8 m.). Collegiate church: Nor., E. Eng., and later; central tower, clerestory, eastern Lady chapel, early font, sedilia, monuments, chests, armour, library.
 Colebrook (Crediton †, 4 m.): Screen.
 Lapford † (Exeter, 17 m.): Screens and carved oak to benches and roofs.
 Nymet Rowland (Lapford †, 2 m.): Wood arcade; Nor. and later.
 Coleridge (Eggesford †, 3 m.): Screen.
 Brushford (Eggesford †, 3 m.): Wood spire.
 Chulmleigh (Eggesford †, 3 m.): Screen, armour.

ASHTON † (Exeter, 8 m.): Screen with paintings, glass.
 Doddiscombsleigh (Ashton †, 2 m.): Glass.
 Dunsford (Langdown †, 2 m.): Monuments, glass, font, and plate.
 Bridford (Christow †, 3 m.): Screen.
 Chudleigh †: E. Eng. tower, benches, font, screen.

BARNSTAPLE †: E. Eng. and later; lead-covered spire, monuments; St. Anne's Chapel in churchyard, used as a grammar school, has some interesting E. Eng. and Decor. work and later woodwork.
 Pilton (Barnstaple †, ½ m.): Portions of old prior church, screen pulpit, with hour-glass stand.
 Bishopstawton (Barnstaple †, 2 m.): Decor. and Perp., with spire.
 Swimbridge (Barnstaple †, 3½ m.): Screen, font enclosure, monuments.
 Tawstock (Barnstaple †, 2 m.): Decor. and Perp.; monuments, state pew, carved benches.

Chittlehampton (Umberleigh †, 2 m.): Loft and ornate tower, known as "Beauty"; carved timber roofs, fifteenth-century brasses, carved stone pulpit.

Atherington (Umberleigh †, 1 m.): Screen, with loft remaining; carved bench-ends, brasses, and tombs.

South Molton †: The third of the noted towers named "Strength"; monuments, stone pulpit.

North Molton (S. Molton †, 2½ m.): Screen and oak pulpit.

Kingsnympton (S. Molton Rd. †, 2½ m.): Screen and spire.

Braunton † (Barnstaple, 5½ m.): E. Eng. and Perp. spire, cradle roof, fine carved benches, brasses, iron coffer.

Ilfracombe †: Nor. and later styles.

Morthoe †: In several styles; carved oak seats, tombs.

Combemartin (Barnstaple †, 5 m.): Screen, brass, monuments, glass, oak seats, and chest.

BIDEFORD †: Rebuilt except tower; font (Nor.), Grenville monument (1513), screens.

Wear Gifford (Bideford †, 4 m.): Decor. and Perp.; good roof, tombs.

Abbotsbroom (Bideford †, 2½ m.): Carved bench-ends.

Littleham (Bideford †, 2½ m.): E. Eng. and Perp.; fresco, carved oak.

Hartland (Bideford †, 13 m.): Tower, screens, stone altar, brass pulpit, font (Nor.).

Welcombe (Bideford †, 15 m.): Early screen.

Gt. Torrington †: Rebuilt 1651; pulpit, some leadwork.

Beaford (Portsmouth Arms †, 6 m.): Oak roof.

St. Giles-in-the-Wood (Torrington †, 3 m.): Brasses of the fifteenth, sixteenth, and seventeenth centuries.

Friethelstock (Torrington †, 1 m.): Oak seats; adjoining are ruins of a priory of Austin Canons (1220).

Monkleigh (Torrington †, 2 m.): Carved oak seats, screens, brasses, and monuments.

Clovelly (Bideford †, 11 m.): Nor. and later; font (Nor.), brasses, oak seats.

Woolfardisworthy (Bideford †, 8 m.): Nor. and later; font and door of Nor.

BOVEY TRACEY †: Screen, stone pulpit, and monuments.

Lustleigh † (Bovey, 2½ m.): E. Eng. &c.; Easter sepulchre, effigies (fourteenth century), stoup, screen, inscribed Runic stone plate.

Ilsington (Bovey †, 2½ m.): E. Decor. and later; screens, effigies, carved benches, parvise, ale-trough, lych-gate.

ASHBURTON †: Late Nor. &c.; carving, vestry.

†, Widdecombe-in-the-Moor (Ashburton †, 6½ m.): "The Cathedral of the Moor"; tower, screen, piscina, and sedilia.

NEWTON ABBOT †. Wolborough: Screens, brass lectern, glass, benches, and monuments.

Bishopsteignton (Teignmouth †, 2 m.): Nor. and Perp.; Nor. carving.

Combe-in-Teignhead (Teignmouth †, 3 m.): Screen, font, brasses, bench-ends.

Stoke-in-Teignhead (Teignmouth †, 3 m.): Brasses (fourteenth century), screen.

Haccombe (Newton Abbot †, 3 m.): E. Eng. &c.; screens, brasses, tiles, and monuments.

East Ogwell (Newton Abbot †, 3 m.): E. Eng. &c.; screen, benches, monuments.

West Ogwell (Newton Abbot †, 2 m.): Cruciform plan, E. Eng., &c.; sedilia, oak pulpit.

Torbryan (Newton Abbot †, 4 m.): Lych-gate, screen, pulpit, glass, churchyard cross.

Ipplepen (Newton Abbot †, 3 m.): Screen, oak pulpit, piscina and aumbry, churchyard cross, ancient chalice.

TOTNES †: Stone rood screen and internal stairs to ditto, carved benches.

Little Hempstone (Totnes †, 2 m.): Ancient glass, screen, effigies, and fonts.

Staverton (Totnes †, 3½ m.): Screens.

Berry Pomeroy (Totnes †, 2 m.): Fine monuments, screen, brass, pier-caps.

Harberton (Totnes †, 2½ m.): Carved stone pulpit, screen, font, porch, parvise, churchyard cross.

Tor Mohen (Torquay †): Of more interest than the Parish Church are the ancient chapels on Chapelhill and at Ilsham; also Torre Abbey.

Corkington (Torquay †): Screen, benches, wood pulpit.

Paignton †: Nor., E. Eng. &c.; stone screen, pulpit, effigies, churchyard cross.

Marldon (Paignton †, 2 m.): Monuments, vestry.

South Brent † (Totnes, 8 m.): Early Nor. tower, font, sedilia, ironwork.

DARTMOUTH † (St. Saviour's): Partly Decor.; fine screen with painted panels, carved stone pulpit, carved woodwork, ironwork, leadwork, fine brasses (c. 1408, 1470, 1600).

Townstall: E. Eng. &c.; effigy.

Blackawton (Kingswear †, 6½ m.): Screen, sedilia, font, fine brass.

Slapton (Kingsbridge †, 7 m.): Spire, screen, tower, and ruins of Poole Priory.

KINGSBRIDGE †: Cruciform plan, central tower with spire, E. Eng. &c.; plate, miserere stalls.

Dodbrook (Kingsbridge †): Screens, mural painting (death of Becket).

Bigbury (Loddiswell †, 2 m.): Decor., &c.; inscriptions, spire, brass.

Aveton Giffard (Loddiswell †, 3 m.): Cruciform, central tower.

East Allington (Kingsbridge †, 4 m.): Screen, pulpit, brasses.

Ringmore (Kingsbridge †, 6 m.): Early Nor. &c.; tower with spire.

Holbeton (Ivybridge †, 5½ m.): Screen.

PLYMOUTH. St. Andrew's: Tower, monuments. Charles Church (1640-57).

Plympton St. Mary † (Plymouth, 5 m.): Interesting church; vaulting, brasses, effigies; remains of Nor. priory in village.

DEVONPORT. Stoke Damerel: Monuments.

Bere Ferrers † (Plymouth, 8 m.): E. Eng. &c.; effigies, glass, font, bench-ends.

Tamerton Foliot (Bickleigh †, 3 m.): Effigies (c. 1350).

TAVISTOCK †: Double south aisle, effigies, tower.

Brentor † (Tavistock, 5 m.): A small hill church; Nor., E. Eng., and Perp.; font.

Lydford †: E. Eng. and later; font.

Sampford Courtenay †: Carved oak.

Abbots Bickington (Holswoth †, 3 m.): Spire and glass, Spreyton (Bow †, 3 m.): Oak roof with inscriptions.

SOME OBSERVATIONS ON
THE REPORT OF THE COMMITTEE
ON REINFORCED CONCRETE.*

By E. P. WELLS, C.E.

THE first thing I take exception to in the Report is the use of either cinder or coke-breeze, even if made with clean fresh water, as I have noticed failures taking place where this material has been used, and in all cases where I have had the work broken up the steel or iron has been badly oxidised. About twelve months ago I had a slab made of coke-breeze concrete 4 to 1, span 14 feet in the clear, and 6 inches thick. The reinforcement consisted of $\frac{1}{2}$ -inch rods, 4-inch pitch, with cross-rods $\frac{3}{8}$ inch by 12-inch pitch. The $\frac{1}{2}$ -inch rods were 1 inch from bottom of slab to centre of same. The rods were clean when put in, not oxidised or coated with a cement wash. The centering was left up for six weeks after it was made, and when struck there was a deflection of over $\frac{1}{2}$ inch due to dead load only. About twelve months after being made the slab was broken and every rod was found badly oxidised, though the concrete to all appearance was perfectly solid. Another instance:—A little less than two years ago we had thought of using (for a large work) the cinder obtained from the Liverpool destructors which was highly recommended as being perfectly satisfactory for concrete. I made some cubes in the proportion of 5 to 1, using a small amount of sand, and after seven days the crushing result was over 190 tons per square foot. When the cubes were twelve months old I observed that they were beginning to blow at several points on all faces. I then put a cube in the crushing machine, with the result that it collapsed at 123 tons per square foot—a fall of about 70 tons in twelve months. This decided me in the future never to use coke-breeze or cinder, as one cannot tell, except upon analysis, what impurities are in the material. With the ordinary coke-breeze employed by builders there are often small pieces of coal, and in course of time if the concrete is made hard and free from voids this coal will force off the surface, unless the gases can escape through the porous material.

I think it should have been stated in the Report that where concrete is used what one may call wet, very little punning is necessary, as it only forces the cement to the surface, which then runs away with the water. If the concrete is what is called dry mixed, then it must be thoroughly well punned, or else there will be little or no adhesion between the concrete and the steel reinforcement.

The reason why brick concrete suffers more than cinder concrete from fire is because very often the test has been made much too early, and the brick has not parted with its moisture; hence the forma-

tion of steam, which is bound to disintegrate the mass. If brick concrete were tested twelve months after being made I think you would find it would give better results in case of fire than any form of stone or cinder concrete.

I quite agree that the covering to the reinforcing in main beams should be $1\frac{1}{2}$ inch to 2 inches as a maximum, but with reference to the floor slabs I am of opinion that $\frac{1}{2}$ inch is ample.

With regard to columns 12 inches square and over, the centre of the rods should in all cases be not less than 3 inches from the faces. There will then be a considerable strengthening of the steel owing to the amount of concrete surrounding it.

With regard to the aggregate, I find from experience that if the size is $\frac{3}{4}$ inch down to $\frac{1}{8}$ inch, and the sand from $\frac{1}{8}$ inch down and mixed in the proportion that I have adopted of 5 to 1 (3 of stone, 2 of sand, and 1 of cement), it gives greater crushing results than where the stone is $\frac{3}{4}$ inch and over, except in the case of Portland-stone aggregate, when the difference in crushing is not so great. Unfortunately this stone cannot be used for reinforced concrete work owing to its being a limestone, otherwise greater strength could be obtained with Portland stone as an aggregate than with any other material.

There are great differences in strength between the various cements as made in this country. With regard to the ordinary cement of good quality, if I want to get a crushing resistance of 200 tons per square foot at six weeks I must make the proportion 4 to 1. If I want 200 tons per square foot, using a specially good cement, I can make it $6\frac{1}{2}$ or 7 to 1, and for 300 tons per square foot concrete with the same specially made cement I use 5 to 1, and if I want 400 tons per square foot I use 4 to 1. For the latter, and using ordinary cement, the stuff would have to be made perhaps 2 to 1 or even stronger. I generally allow in my calculations for ordinary work that the concrete shall stand 200 tons per square foot, and everything is based on this assumption, except in the cases of columns desired to be made as small as possible: these I work up to 300 or 400 tons per square foot at six weeks old. With regard to the testing, it is of very little use to make your cubes for testing at the same time as the work is being constructed. What I do is to make the test before any of the work is done, and at the end of seven days I can tell by resistance to crushing what its value is going to be in two months, or its ultimate crushing after a lapse of four or five years. If I find the seven-day result is falling below what it ought to be, then I have other cement brought on to the works, or an increased amount added to bring the crushing up to the required standard. I am glad to see that you recommend that the tests should not be made until two months have elapsed in the winter-time; if it has been a severe winter the interval ought to be increased from two and a half to three months.

I quite agree that the test load should not exceed one-and-a-half the accidental or live load.

* Extract from a letter addressed by the author to Mr. H. D. Searles-Wood, Hon. Secretary of the Committee.

With regard to the loads coming on to columns or piers in buildings, I see the Committee recommend certain percentages to be deducted from the accidental loads on each floor until such time as the reduction amounts to 50 per cent. of the assumed load on the floor. This, I think, is quite in order for any building that is used for offices or private dwellings; but in the case of a factory or warehouse, where the floors may be and often are loaded up to their full, no deductions should be made for these loads. In the case of the foundations to a column, they should in all cases be calculated on the assumption that every floor will have to sustain the full working load.

Working Stresses.—The working stresses given are low for a concrete that will crush at 200 tons per square foot at a month. I, as a rule, allow for concrete in compression in beams subjected to bending 600 lbs. per square inch, whereas I might allow with safety 800 lbs. per square inch, which would then give me a factor of 4 to 1 in the concrete. I am a great believer in having a higher factor in the concrete than you have in the steel, as I find that the richer and the stronger the concrete is to resist compression, the stronger is the beam and the greater is the adhesion or friction of concrete to the metal. A low crushing resistance in concrete does not give much adhesion, and when loaded up to one-third or less of its ultimate crushing it will begin to show signs of a permanent set.

While I am speaking upon this subject I will give you the result of a cube that I tested on 4th May 1899 which was made on 27th April 1898. The cube was 4 inches by 4 inches, and was made of 4 to 1 concrete, the aggregate and the sand being Guernsey granite.

The block was put in the crushing machine at 4.25 p.m. on May 4th, and when 44 tons was applied the set or compression was nil; at 50 tons nil.

At 60 $\frac{1}{2}$ tons the compression was $\frac{1}{2000}$ of an inch.
 " 70 $\frac{1}{2}$ " " $\frac{1}{2000}$ "
 " 80 $\frac{1}{2}$ " " $\frac{4}{2000}$ "
 " 90 $\frac{1}{2}$ " " $\frac{26}{2000}$ "
 " 100 $\frac{1}{2}$ " " $\frac{20}{2000}$ "
 At noon on May 5th the compression was $\frac{11}{2000}$ of an inch.
 " 3.50 " 6th " $\frac{13}{2000}$ "
 " 4.30 " 13th " $\frac{11}{2000}$ "

So that between May 4th, when the load of 100 $\frac{1}{2}$ tons per square foot on the block was applied, and May 13th it had compressed $\frac{6}{2000}$ of an inch. The block was then tested to destruction and broke at 183 tons per square foot. This shows that with a block of this strength one-third the ultimate crushing has practically had no effect on the concrete. Sixty tons per square foot gives about 933 lbs. per square inch. So if a T-headed slab is worked out for 600 lbs. per square inch, and tested with 50 per cent. additional loading, there could not be any permanent set in the concrete. The tests that I am getting now at six weeks are nearly double 183 tons per square foot owing to the cement

being of a proper nature and much more finely ground. I allow for concrete in columns in all cases 600 lbs. per square inch, if I use a richer concrete 900 lbs. per square inch, and if I use a very rich concrete then 1,100 to 1,200 lbs. per square inch.

With regard to the Committee's recommendation that concrete in shear in beams should only stand a stress of 60 lbs. per square inch, this is, in my opinion, very low indeed, and I should say this has been obtained from American tests of a lean concrete. I made a test some short time ago which gave for 6 to 1 concrete 484 lbs. per square inch as the ultimate. Another test with 5 to 1 concrete gave 500 lbs. per square inch.

I had some tests made with 5 to 1 concrete made as follows:—3 parts of Spurn gravel $\frac{3}{4}$ down, 2 parts of Spurn sand, and 1 part of cement. The cement used was the "Pelican" brand of Messrs. G. & T. Earle, Ltd., of Hull, the water used for gauging being 9.7 per cent. When thirty-one days old the cubes were tested by Messrs. David Kirkaldy & Son both for compression and for shear. The compression tests are as follows:—No. 1, 5,545 lbs.; No. 2, 4,451 lbs.; and No. 3, 5,166 lbs. per square inch, or 356.6 tons, 286.2 tons, and 332.2 tons, giving an average of 325 tons per square foot. These cubes were made at the same time as the test pieces made for shear, and from the same gauging. I cannot do better than quote Messrs. Kirkaldy's letter, because I think the results obtained do not, in my opinion, give the true resistance to shear. Messrs. Kirkaldy's letter is as follows:—

" We have the pleasure to enclose herewith the report upon the crushing tests, but we are not issuing an official report upon the shearing tests, as we do not feel satisfied that we entirely obviated all bending moment. The fractures show good shear however.

" As a matter of interest we give below the results obtained upon the shearing specimens:—

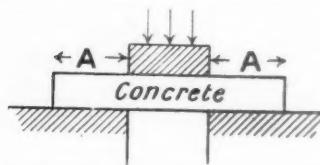
Test No.	Length	Breadth	Depth	Sec-tional Area	Total Stress	Double Shear per Sq. In.		Single Shear per Sq. In.
						Sq. Ins.	Lbs.	
P.P. 2943	24.00	6.06	6.02	36.48	39,450	1,081	540	
2944	24.00	6.07	6.03	36.60	38,000	1,038	519	
2945	24.00	6.06	6.08	36.84	43,400	1,178	589	

Weight of sample: P.P. 2943, 74.71 lbs.; P.P. 2944, 74.58 lbs.; P.P. 2945, 74.75 lbs.

" We should be interested to learn the proportion of aggregate to cement in the concrete at your convenience, so that we may record same in our books in the usual way."

You will observe here that the lowest is 519 lbs., and the highest 589 lbs. per square inch, but the crux of the whole question is in their remark "we do not feel satisfied that we entirely obviated all bending moment." I think that when a test is

made for shear—that over the areas marked A A on the sketch—the same should be thoroughly well held down, to prevent any tilting of the beam; and until this is done



I do not think that any satisfactory conclusion can be arrived at. According to the tests it looks as if, assuming that no bending moment was put into the shearing piece, that shear may be taken anywhere between 10 and 11 per cent. of the ultimate crushing. It is my opinion—I may be wrong—that the shear, if correct, ought to be somewhere about 40 per cent. of the ultimate crushing. I intend having some rectangular beams made heavily reinforced in compression and tension, and the reinforcement members carried to within one foot of the points of support of the abutments. I shall make the reinforcement so heavy that the beam has got to shear. I shall then find out what is the correct shear in the beam when subjected to bending.

With regard to the adhesion of concrete to metal being 100 lbs. per square inch, this I consider very much too low indeed, especially for a 5 to 1 concrete. For 8 to 1 it is about right.

The whole of the Committee's formulae for beam calculation is very interesting indeed, but at the same time cannot be used for the present-day method of doing work—viz. eternal rush. One has to make empirical formulae so as to save time, and always to be on the safe side. This I have done in all my beam and column calculations; and as the work has in all cases stood the most satisfactory tests, I do not feel inclined to depart from the methods I have adopted. As I can do most of them on the back of an envelope, I do not feel inclined to waste a page of foolscap. With regard to beams of rectangular section, I nearly always adopt the double reinforcement, as I find it much cheaper, the amount of steel required in the compression of the beam being ever so much less in value than the amount of concrete that has to be put in to take up the compression coupled with vertical shear members. With regard to the T section of beams I adopt as a rule a uniform breadth of slab for the compression half of 60 inches. This I consider is very conservative indeed, and I allow over this area a compression of 600 lbs. per square inch, which for a 4-inch slab equals 64 tons, a 4½-inch 73 tons, 5-inch 80 tons, 5½-inch 88 tons, and a 6-inch 96 tons. In making my calculations I allow for the effective depth to be from the axis of the steel reinforcing in tension to the centre of the T slab, so that when I find any of my stresses are coming below the tons given above, no steel reinforcing is required in the compression half of the T-headed beam. You can easily see how this simplifies matters, and acts you will find everywhere in safe

limits, even assuming that the concrete should not be all that is desired.

I notice that you find there is no satisfactory theory or trustworthy experiments from which the strength of rectangular slabs supported or fixed on all four edges can be determined.

I give you now the result of some slabs supported at ends only that were made from my designs for the Central London Railway. They were 2½ inches thick by 1 foot 7 inches wide. The concrete was 4 to 1. Crushed Thames ballast ½ down. Age when tested 35 days. With a clear span of 7 feet the beam took a distributed load of 4 tons before collapsing. It then failed in tension. The total area of reinforcement spread over the full breadth was 83 square inch, and the centre of the rods was ½ inch from the bottom or tension side of the slab. If you will go into this matter you will find that there were stresses in the steel and in the concrete that there had no business to be. Another case of a plain rectangular beam 6 inches by 6 inches, 5 feet clear span, concrete 5 to 1, composed as to 3 : 2 : 1, age six weeks, carried a central load of 2 tons before breaking. This beam had no steel reinforcement.

With regard to the columns, I have a very simple formula which I use for concrete, giving an ultimate resistance to crushing of 200 tons per square foot. As I previously stated, this is what I generally use for work that I design. I assume that the column, including the steel, is to carry 900 lbs. per square inch, 600 lbs. of which I allow to the concrete and 300 lbs. to the steel. I assume that the steel shall only carry 3 tons per square inch, and this gives 4½ per cent. of the full sectional area of the column. The reason why I keep to 3 tons is on account of the large amount of initial compression being put into the steel during the setting action of the concrete. This is disadvantageous for a column, but with regard to a beam or a floor slab is, in my opinion, one of the reasons why when such work is tested to destruction it gives theoretic stresses of the steel that the same cannot stand. When columns are tested to destruction they always collapse before the calculated load is reached, owing, I think, to the steel being calculated on too high a basis. When I use concrete crushing at 300 or 400 tons per square foot I am enabled to reduce the area of the column, but have to increase considerably the area of the steel so that the ultimate crushing may show that steel and concrete are balanced. I have an enormous amount of data at hand with reference to the crushing of concrete made with the finely ground cements that are now made in England. The other day a 5 to 1 concrete had a crushing resistance of 416 tons per square foot at twenty-eight days old, and with neat cement that was six months in water and twelve months in creosote crushed at 1,366 tons per square foot, or about half the strength of wrought iron. The whole secret, in my opinion, of reinforced concrete work

lies not so much in the fact of the steel reinforcement, which may be low, as in exceptionally strong or rich concrete. The richer the concrete, the greater adhesion to the steel, the greater amount of initial compression is put into the steel, the crushing stresses are largely increased, and there is no chance of the concrete failing in compression. I believe in having a factor in compression of at least 6 or 7 to 1, and there will be no failure; but with weak compression it will begin to show signs of failure very early.

I have seen cases of very weak reinforcing, and in fact I can show you work now that was designed to carry 30 lbs. per square foot, and for the last two years has been loaded to over 1½ cwt. per square foot without any sign of failure. In this case the concrete was very good. If it had been poor, the friction between the concrete and the steel would have been very little, and the work would collapse.

In continuation of my previous notes I think the following tests may be of interest, as the concrete was made with a pure rotary cement (Pelican brand), 9 per cent. on 180 by 180 sieve. The mixture was in the proportion of 3 parts Spurn gravel $\frac{3}{4}$ down, 2 parts Spurn sand $\frac{1}{8}$ down, and 1 part of cement. The following are the results, 7 days, 1 month, and 3 months, kept in air and kept in water:—

Tensile—	7 days	1 month	3 months
2½-inch section Air	425 lbs.	597 lbs.	713 lbs.
Water	646 lbs.	970 lbs.	*966 lbs.
Compression—			
6-inch cube Air	49 tons	78 tons	91 tons per cube
= per square foot	196 tons	312 tons	364 tons
Water	56 tons	104 tons	132 tons per cube
= per square foot	224 tons	416 tons	528 tons
* Bad briquette included; without this, average is			1,050 lbs.

The briquettes were made from the concrete. I was anxious to see if there was any ratio that could be depended upon between the tensile tests and the compression tests. You will observe that the crushing increases at a very much higher ratio than do the tensile tests. The crushing test of 528 tons per square foot for a 5 to 1 concrete at 3 months is, I believe, the highest result for that gauging that has ever been obtained; in fact with nine-tenths of the Portland cement made this result is greater than could be obtained with any neat crushing tests. The increase between concrete kept in air and in water is very great—104 tons at 1 month, and 164 tons at 3 months. The concrete was made exactly the same as it would be if used on the works, and you can easily understand that columns made with 5 to 1 concrete and with this rotary cement will stand a little more than 600 lbs. per square inch; in fact, at 3 months you could put with perfect safety 1,400 lbs. per square inch without any steel reinforcing at all.



9, CONDUIT STREET, LONDON, W., 28th September 1907.

CHRONICLE.

Sessional Paper on St. Paul's.

Mr. Mervyn Macartney [F.], Surveyor to the Fabric of St. Paul's Cathedral, and one of the Special Committee appointed by the Dean and Chapter to examine and report upon the stability of the building, will read a Paper dealing with the present condition of the Cathedral at the General Meeting of the Institute to be held on Monday, 18th November.

The Experts' Report on St. Paul's Cathedral.

The report of the committee of experts appointed to investigate the condition of St. Paul's Cathedral has been made public since the last issue of the JOURNAL, the document being published in full in the current month's *Architectural Review*. The Committee, consisting of Sir Aston Webb, R.A. [F.], Mr. John Belcher, A.R.A. [F.], and Mr. Mervyn Macartney [F.], were instructed to examine and report upon (1) The stability of the whole structure of the Cathedral; (2) The extent to which the stability has been or is likely to be affected by any alterations or disturbances in the foundations of the Cathedral or in the soil in its neighbourhood; (3) The measures which ought to be taken to remedy such defects or guard against such damages as may be discovered. The Committee state their opinion that great danger to the Cathedral has been averted by the adoption, as they advised, of another route for the projected London County Council sewer, which was originally proposed to be taken within 45 feet of the south-west tower of the Cathedral. Documents consulted by the Committee show that a settlement was at work even in Wren's time when the building was in progress, and settlements, particularly in the piers supporting the dome, have continued in some degree to the present day. The principal fractures in the building appear to be of long standing, and there is no record of their origin; but at present, the Committee state, these give no ground for special anxiety; no evidence of "crushing" as a result of the various settlements has been discovered. The Committee conclude:—"After mature deliberation

and a thorough examination of the Cathedral and its foundations, we are of opinion that, in spite of these settlements, there is no immediate necessity for any extensive remedial measures to be undertaken; but this conclusion is based on the assumption that the present conditions of the subsoil and the present water level will be maintained. We are strongly of opinion that the sensitive condition of the structure makes it necessary that the church should be kept under constant observation, and we understand that a scheme for this has been formulated by Messrs. Barry and Leslie, your engineers. We recommend that your surveyor be instructed to make the necessary arrangements for its adoption, and for readings to be taken every three months. We also recommend that the condition of the subsoil and the state of the water level be carefully watched and periodically recorded, as all official investigations point to the same conclusion—that in them lie the possibilities of future dangers. In this connection attention should be given to all building operations in the neighbourhood, or mischief of a more serious nature may arise. We may mention that we have carefully considered the various safeguards and remedies brought forward at our meetings and published by the Press and others interested in the building, but we do not advise works of underpinning or of screening the foundations of the church. We consider that such operations would only be attended by fresh dangers. On the other hand, we consider that there is a large amount of structural work required in repairing the fabric which should be proceeded with without delay. The condition of the external stonework also calls for attention, and we have had the advantage of the opinion of Professor Church, who advises the removal of the incrustations of soot and gypsum by a wood tool, and the experimental spraying of portions of the surface with baryta."

Acton Council Offices Competition.

A copy of the last number of the JOURNAL containing the correspondence which had passed between the Institute Board of Professional Defence and the Acton District Council, and notifying the steps taken by the Institute Competitions Committee, was addressed to the Acton Council immediately after publication. A letter since received from the Chairman of the latter body, and the reply of the Secretary R.I.B.A., are appended:—

11 Marlborough Crescent, Bedford Park, W.
4th September 1907.

To the Editor JOURNAL R.I.B.A.,—

SIR,—I can only voice the remarks of members of your Association made to me as Chairman of the Urban District of Acton, representing a population of 50,000.

Allow me to say in my private capacity, recognising as I do the importance and influence of your great body of professional men, that it is a

matter of astonishment to myself—also a professional man—that the R.I.B.A. should have delayed making inquiries of the Council until a writ had been issued by your complainant, which, as everyone knows, precludes the possibility of giving you any further information than that disclosed in the minutes of the Council. But if the matter does go into Court, which cannot be till after the competition is closed, you will, I believe, find that the Council as a body is only actuated by a recognition of its moral and legal responsibilities based on facts which might have been laid before your association had earlier steps been taken, or the legal proceedings been commenced in the ordinary way after the Long Vacation had terminated, or a reasonable time before it had begun. As it is, many of your members suffer the injustice, or what may turn out to be the injustice, of being debarred from entering into a competition which would have opened a prospect of considerable advantage to some of them. I myself feel strongly the imputation that the Acton Council has not acted as any honourable body of men ought to have acted, and I believe you will yet arrive at the conclusion that it has.—Faithfully yours,

H. S. SCHULTESS YOUNG.

*R.I.B.A. : 13th September 1907.
To H. S. Schultess Young, Esq., Chairman
Acton Urban District Council,—*

DEAR SIR,—With regard to your letter of the 4th instant, addressed to the Editor of the JOURNAL R.I.B.A., I beg leave to point out that the action of my Committee was taken immediately after the facts were brought to their knowledge, and that my Committee could only form an opinion on the facts as presented to them by both sides in the dispute. In the information sent to the Institute by the Acton Council nothing was brought forward which in the judgment of my Committee could in any way justify the action the Acton Council were taking. If such facts as you refer to exist, it is difficult to understand how the circumstances of a writ having been issued could have prevented them being stated in some way, and also how such a statement could have prejudiced the case of the Acton Council.—I am, dear Sir, yours faithfully,

W. J. LOCKE,

Secretary R.I.B.A.

As a result of a resolution passed at a meeting of the Institute Competitions Committee on the 24th inst., the following letter has been addressed by the President of the Institute to the Clerk of the Acton District Council with reference to the appointment of an Assessor as advertised by the Acton Council:—

*R.I.B.A. : 26th September 1907.
To the Clerk, Acton Urban District Council,—*

DEAR SIR,—It having been brought to my notice that in the Conditions of this Competition you state that the Assessor will be appointed by the

President of the Royal Institute of British Architects, I regret to be compelled to inform you that under existing conditions it will be impossible for me to co-operate with you in this way.

No doubt you will consider the propriety of issuing some notification of this fact to those gentlemen who have received copies of the Conditions.—I am yours faithfully,

T. E. COLLCUTT,
President R.I.B.A.

Crosby Hall.

News lately with regard to Crosby Hall has been a little conflicting. It was stated a few days ago that definite instructions had been given for the demolition of the building, and that the work would commence on 30th September. As a fact, the modern front on Bishopsgate Street has already disappeared, and the old Hall itself now stands partly disclosed. Sir Vezey Strong, however, at the Court of Common Council last week, spoke in hopeful terms of the progress of his scheme for acquiring the building. The Lord Mayor, too, is interesting himself in the matter, and is to preside at a round-table conference to be held next Tuesday at the Mansion House, to which all concerned in the properties involved have been invited. It is satisfactory to learn that the attitude of the Chartered Bank of India continues friendly, but a strong hint has been conveyed to the promoters of the preservation scheme that an early decision must be come to.

To compensate the Bank for giving up its property in the Hall, it is suggested that buildings with a sixty-feet frontage on the northern side of the existing entrance to Great St. Helen's should be acquired, that the present thoroughfare and a portion of the property to be acquired should be handed over to the Bank, and that a new entrance to Great St. Helen's should be made north of the square block which the Bank would then possess. The Bank would seem to gain by the exchange, as they would get for their back land a very valuable addition to their frontage in Bishopsgate Street.

As regards ways and means of raising the necessary funds for completing the project, it is thought that the big City companies will give generous assistance. The public, too, after His Majesty's expression of opinion may be relied upon to subscribe a substantial amount. There are some forty livery companies which do not possess halls of their own, and they have to meet and dine at restaurants or hotels, or else apply to one of the larger companies for the use of a hall. It is suggested that these companies without halls should guarantee a certain annual rental for the Banqueting Hall, and have the use of the grand old place on so many days in the year. There would thus be an income-producing asset on which money could be raised, and the building would become a common hall for the associated livery companies.

Alderman Sir T. Vezey Strong, in a letter in *The Times* of the 24th inst., says:—

The central idea of preserving Crosby Hall is that it may not only stand for future ages as a beautiful monument of the architecture and associations of the dead past, but may serve—that great need of the present time—as a centre at which the representatives of the ancient guilds and modern societies concerned in technical education and industrial progress may meet for the promotion of the great commercial and industrial interests of the nation, which could nowhere be so appropriately focussed as in the City of London. It is felt that the formation of such a centre for the reforming activities of the age would furnish another and perhaps the highest practical example of the adaptability of ancient institutions to modern needs.

Beyond discussing this general desire, all that has been done up to this time has been to ascertain the practical possibilities of the case. To this end Mr. W. D. Caroe, architect to the Ecclesiastical Commissioners, who has taken the warmest interest in the scheme, has most kindly assisted the plans by making the necessary survey of the ancient buildings. The freeholders have also been approached, and have intimated that they are prepared to sell on fair terms the site which the Chartered Bank of India, Australia, and China are ready to exchange for that on which the ancient hall stands. Negotiations are also on foot, and considerable progress has been made with the tenants.

The Decorator's Craft.

The fourteenth annual convention of the National Association of Master House-Painters and Decorators opened at St. George's Hall, Liverpool, last week, and with it an exhibition of decorative work and manufactures, and of the drawings submitted in the apprentices' and international studentships' competitions promoted by the Association. From the presidential address delivered on the occasion by Mr. G. H. Morton it seems that the Association are taking seriously in hand the education of apprentices in the decorator's craft. Prizes are awarded for the best work, both plain and decorative; and scholarships have been founded which enable successful students to spend some six months in Italy or other approved country in the study of decorative art abroad. The Association established at Manchester some four years ago a School of Decorative Painting on methods adopted abroad, particularly in Germany.

Mr. Morton, in the course of his address, said that all efforts for the better education of the decorator would not avail so long as a mistaken system of competition prevailed. To the ordinary commercial mind there was only one kind of competition—that of price. As a matter of fact there were other kinds, far more intrinsically important. There was competition in quality of work, in the artistic conception and in the carrying-out of a scheme, and in avoiding excess—for good decoration did not necessarily mean superabundance, but in most cases the very reverse. The great thing in decoration was to know when to stop. Competition of merit, not of price, was so frequently ignored that the painter of to-day had little time or encouragement to do his best work; his chief

concern was not to lose on his contract. Most decorators' works, especially public works, were competed for by an absurd number of persons or firms of various capabilities and reputation. When such was the case, the probability, almost the certainty, was that the successful competitor—presumably the lowest in price—was quite incapable of carrying out the work with any artistic feeling whatever, often incapable of appreciating even what good work was, and the result, from the artistic point of view, was utter failure, and, from the point of view of work, bad. The idea was that the architect or surveyor would supply the art and see the work properly done. The architect might be quite competent in these respects, but if his client insisted on the lowest tender being accepted, and if the painter employed was incompetent, how could the architect's or anybody else's ideas be realised? It was equivalent to attempting to paint a picture with a trowel or a stick.

Sir William Forwood, who opened the exhibition, said that no one could go round it without being struck with the remarkable progress made in decorative art during recent years. Some of the examples of craftsmanship on exhibition were really magnificent. Whilst admitting that their progress in decorative art had been very great, he thought they should ask themselves the question whether it had been and was still proceeding upon the right lines, and whether it was all true progress, or simply a reaction from a very ugly period. They should also consider whether, in regard to decorative art, they had not arrived at a period when they were, so to speak, waiting for the development of a new art. It seemed to him that that was exactly what had happened at the present moment. Colour was the test of true decoration. Unfortunately, the new art strove after originality; he thought art ought to strive after beauty. He did not care what originality they might have; if the design in itself was not beautiful the effect could not be good. He knew of a house built and decorated for a gentleman who, when the work was finished, was told by the architect that such was the character of the decorations that he must not have one picture in it. At last, after a great deal of persuasion, this gentleman was allowed to hang on the walls just one picture of a distinguished statesman and ancestor. He (Sir William) believed there was no more beautiful form of decoration than pictorial decoration of the highest class, and he did not believe decoration would be proceeding on right and true lines until it recognised that and led up to the pictorial form rather than turn it out of the house and discard it. Pictorial art in this country had made great strides, but they could not expect it to continue to make great strides unless it had encouragement. If in carrying out their house decorations they excluded pictures, he wanted to know what was to become of the art of England. To adorn their houses with the pictorial art was the best form of decoration they could adopt.

Colour on Buildings.

Mr. Halsey Ricardo [F.], at the Decorators' Convention above mentioned, delivered an address upon "The External Application of Colour to Buildings," pleading for a more prominent place in the minds of both the public and decorators of the advantage of more truly artistic colours outside buildings. Touching the educational value of colour, he said that phase seriously affected the younger generation. The older people had grown up amidst the dreary monotone of their buildings, and had, mostly, got the idea that it always had been so and must always be, and that their life, externally, must be spent amongst dingy surroundings. But their youngsters ought not to be infected with that fatalistic creed. Colour—and good colour too—was not difficult to get. Their advertisements on the hoardings and walls showed that; and what had been found worth doing for so transient a purpose as to puff a proprietary article was surely still more worth doing when it meant guiding and educating their children during the most impressionable years of their lives. A school should not be a gaunt, austere building, but made as attractive and gay as colour could do it—inside and out. The strain on the attention of the scholars during the hours of lessons might safely be diverted and rested by having pleasant objects on the walls to look at, and by making the walls themselves humane and companionable by colour decoration. The children in the East of Europe, and still more so throughout Asia, grew up amongst bright surroundings. Their schools, their mosques and temples, wherein they were taught, were the repositories of the finest efforts in colour and coloured ornament, and the result was that the children, under those conditions of healthy eye-education—conditions that they could command in England were they persuaded to do so—grew up more alert and more tractable than ours who had to struggle with squalor and grim pedantry. There was no sin in bright colour, although it was shunned by many proper people. There was no safety to morals in terms of drab and mud. Bad taste might be committed and indulged more easily by the timid and ignorant use of low tones than by the courageous attempt to have full ones, and the failure was the more insidious and far-reaching because pusillanimity passed for prudence, and naturally, giving no one any sort of satisfaction, must be ranked therefore with virtue, and counted as such, since virtue (so the sour creed ran) was of its own nature an uncomfortable effort and its own reward. They had learnt from some of the modern posters how to deal with colour broadly; let them use that knowledge as a stepping-stone to deal with colour on large surfaces—not treating their efforts as necessarily monumental or imperishable, but recognising the conditions of its use and their material. Then there would grow up a school of house painters, and a tradition how the paint should be spread, and in course of time they might

hope in confidence to see their streets and public buildings looking fresh, clean and cheerful, and—it might be—beautiful.

The Coal Smoke Curse.

Sir William Richmond, R.A. [H.A.], who has earned the thanks of all for his eloquent and unceasing advocacy of the right of man to an unpolluted atmosphere, addressed the Sanitary Inspectors on the subject at their Conference held at Llandudno last week. Sir William said it took a deal of trouble and pains to instil new life, higher and more altruistic aims, into people who sat still, unmoved, unconcerned in an atmospheric *status quo*, as long as money poured in, even if in the meantime the sun was being "put out." Coal smoke was merely waste of fuel. It was a destructive and disagreeable agent, and it was as preventable as it was unnecessary. What was wanted to secure its prevention was that public opinion, which was the governing force in all communities, of the past, the present, and the future, should shake off inertia and with one voice proclaim its determination to force the hands of the selfish or thoughtless and oblige them to cease from abusing their prerogatives of wealth, to abstain from damaging other people's property, destroying beauty, making dirt, obscuring sun, the giver or disseminator of life. The absurdity of the defence of the nuisance that smoke and commerce were inseparable was shown by the fact that every puff of smoke from a chimney was waste, and it was therefore unbusinesslike to permit it. Those who did permit it were shortsighted as to their own interests, and inconsiderate towards others. But man did not live by bread alone. We were gifted in this country with great beauty of landscape, and especially so had we been in regard to the very districts which had now become squalid and unhealthy owing to this smoke curse. No great change which involved the loss of intelligent hand labour was all for good; but granted that machinery was a necessity, those who employed it should be forced by public opinion, and through that by law, not to make it a nuisance and to destroy by its fumes and smoke adjacent properties, trees, fruit gardens, churches, cathedrals, and what not. Our precious Westminster Abbey was fast decaying from the effect upon its surface of coal smoke, and many of our cathedrals were in a like plight. The Palace of Westminster was fast decaying under a like cause. And yet we sat still—Parliament did, anyhow—and let this evil go on until perhaps future generations would be done out of their just rights, the trusts of great works of art given to us to take care of and transmit. When the abominable demon of smoke was expelled—and it would be expelled if we determined that it should be—there would be gardens on our house-tops, trees in all our streets, fountains of pure silver water bubbling up in our squares; there would be

less squalor, less drink, more healthy outdoor life, greater sanitation, and, above all, a happier people.

Tintern Abbey.

Mr. Harold Brakspear, F.S.A. [A], has been instructed by the Office of Woods and Forests to make a complete survey of Tintern Abbey, and excavations are to be made under his direction on the site of the infirmary and buildings of the outer court. Mr. Brakspear states that the site of the gatehouses appears to be covered by roadways, and that unfortunately he will not be able to unearth them, but as much will be done as possible to make the plan as complete as those he has already published of Fountains, Waverley, and Beaulieu.

Council Appointments to Standing Committees.

The following appointments to the Institute Standing Committees have been made by the Council under By-law 46:—

ART COMMITTEE: Sir Aston Webb, R.A. [F.], Messrs. John Belcher, A.R.A. [F.], George Frampton, R.A. [H.A.], T. Raftes Davison [H.A.], W. A. Forsyth [F.].

LITERATURE COMMITTEE: Messrs. John Bilson, F.S.A. [F.], Francis Bond, M.A. [H.A.], J. D. Crace [H.A.], Henri Favager, F.S.A. [F.], A. T. Taylor [F.].

PRACTICE COMMITTEE: Messrs. Ernest Flint [F.], John Murray [F.], W. E. Riley [F.], Wm. C. Waymouth [A.], R. S. Wilkinson [A.].

SCIENCE COMMITTEE: Messrs. Bernard Dicksee [F.], F. N. Jackson [H.A.], Sydney Perks [F.], F. T. Reade [H.A.], W. Jacques [A.].

Criticism Criticised.

Albert Buildings, 49 Queen Victoria Street, E.C., 4th September 1907.

To the Editor JOURNAL R.I.B.A.,—

SIR,—I trust you will permit me the necessary space to deal, as cursorily as may be possible, with some of the criticisms contained in Mr. Bligh Bond's review of my book, *The Principles of Architectural Design*. It is, I consider, a commendable practice to favour the one slashingly criticised with an advance proof so as to admit of the opportunity of commenting upon the remarks in the same issue in which the latter are to appear, and I regret you did not give me this opportunity.*

Under the circumstances, I have refrained earlier from writing; nor do I wish even now to impart a sense of angry disclaimer, where I feel anger is not justified. I am quite aware that the review is not inspired by any animus, but I cannot help feeling

* Our correspondent, presumably, has had exceptional experience. For ourselves we cannot recall even an isolated instance in journalism of the "practice" he commends.—ED.

that Mr. Bligh Bond was the victim of what Dickens called "a bit of undigested cheese" when he wrote so witheringly. I have perhaps a right to this opinion, in view of the generally enthusiastic way in which the book has been reviewed by the Press throughout. And it is with a view that your readers may not be unduly prejudiced that I ask for the space to comment upon Mr. Bond's verdict.

In the first place, though merely in passing, may I suggest that it is irrational to cover two pages with adverse criticism and then to declare that the work cannot be seriously criticised. And I observe that Mr. Bligh Bond has throughout treated as studied designs in the higher qualities of Art what are, for the most part, merely intended as diagrammatic illustrations of particular principles. I should naturally hesitate to dogmatise on the quality of Art in design; principles cannot supply the want of creative genius, but they may support the apt expression of such genius. Therefore, in introducing the views of a house on Plates XI. and XII., I did so diagrammatically (for the house was never intended to be carried out). And so throughout the book Mr. Bond has dealt severely with diagrams from *his own standpoint*, regardless of the immediate purpose of their introduction.

I consider his remark as to "the painful immorality which so many architects are called upon to endure in this work" is as uncalled for as it is ungenerous. Of course I am aware that the review expresses the views of an individual and not of a Commission, and had Mr. A. or Mr. Z. been the reviewer, it is feasible to suppose their views would have ranked with the other good ones to which I referred earlier. But your readers, Sir, will overlook this fact, and are likely to be prejudiced in consequence. As regards "painful immorality," I am confident that Mr. G. H. Fellowes Prynne, Colonel Edis, Messrs. Davis and Emanuel, Seward, Waterhouse, and others, would not experience the sensation.

I absolve your reviewer from a charge of animus—and readily; but I cannot acquit him of a lack of fairness; he complains of my personal views, and almost in the same sentence utters an equal complaint when I quote from the works of architects whose views are generally held in respect; and to pretend that these extracts are inserted in order to add substance *quid* substance is a perversion of facts which an inspection of the pages of my book will easily refute.

Mr. Bligh Bond must have but carelessly read the preface; else he would be aware that, saving in respect to Plates I., IX., XXVI., and XXIX., all the illustrations were produced from my drawings; and I challenge the justice of the terms "slovenly, clumsy, and inept," as applicable to the vast majority—if indeed to any at all; suffice it here to refer to some of the Plates, to which he has not drawn unkind attention for any specific reason, such as Plates V., XVII., XIX., XXV., &c.; were it not for

that "bit of undigested cheese," even Mr. Bond would not cavil at these or many others.

Now, Sir, I am drawing to a conclusion; and in adverturing to the criticisms on "Symbols," I would ask if it is justifiable to omit references to elementary details merely because they are elementary? On that assumption, an arithmetic book should omit the four simple rules, and Euclid should omit the axioms. And it is to be remembered that architectural works do not merely sell in the country of their origin; the book under discussion has already found its way (and not by solitary copies) to distant climes—Japan amongst others; and what may be elementary to home readers may be news to foreigners. And, in this connection, to cavil at illustrations of our Royal Arms and the coinage is a patent absurdity.

The initial kindly reception accorded to my book, both as regards opinions and sales, justifies me in deprecating such a whole-heartedly adverse review as Mr. Bligh Bond has written.

Faithfully yours,

PERCY L. MARKS.

P.S.—I forgot to insert that the so-called jumble of door and window designs is absolutely justified in a book dealing with general principles.

* * * The following letter has been received from Mr. Bligh Bond, to whom an advance proof of Mr. Marks's letter had been sent:—

26th Sept. 1907.

To the Editor JOURNAL R.I.B.A.

Mr. Marks seems to have felt the severity of my remarks in regard to some of his illustrations, which he says were intended to be diagrammatic only. These were nevertheless offered by him for the elucidation of certain architectural principles, and I think he would be the first to admit that they were designed to constitute a recommendation of those principles—to demonstrate their value, in fact, by the good effect of their application.

In my judgment they failed to do so, and further, on general grounds, I thought them wanting in the qualities which would make them fit, apt, or telling as illustrations, whilst some were vitiated by incongruities which I felt bound to condemn.

Whilst a criticism on artistic grounds might with some show of justice be deemed irrelevant (had my strictures been based on these alone), I maintain that there is a standard of technical merit even in diagrams below which a modern publication should not fall; and I would venture to urge upon Mr. Marks the desirability of a wholesale revision of his diagrams in any future edition of his work.

Let me say, in conclusion, that I appreciate the very moderate and good-tempered tone of Mr. Marks's letter, and his willingness to view the work of the critic as above the plane of personal feeling.—I am, Sir, yours faithfully,

FREDK. BLIGH BOND.

